therebetween, the path having one of a plurality of classes of transmission service. The non-real time traffic is received at the core source from a plurality of connections and each of the connections have one of the plurality of classes of transmission service such that at least two of the connections do not respectively have a same class of transmission service. The method includes the step of, at the core source, aggregating the non-real time traffic received from the connections onto the path, the non-real time traffic being transmitted on the path without regard to which of the connections the non-real time traffic is associated and without regard to the class of transmission service of such connections. The method further includes the step of, at the core destination, segregating the non-real time traffic so transmitted on the path according to which of the connections the non-real time traffic is associated. Flow control is applied between the core source and the core destination to thereby regulate the rate of transmission of the non-real time traffic along the path. The path is also provisioned with a guaranteed transmission bandwidth.

The connection oriented communications network may be an ATM network, the plurality of connections may be Virtual Channel Connections (VCCs), the path may be a non-real time Virtual Path Connection (VPC), the non-real time traffic may be ATM traffic and the classes of transmission service may be ATM service categories.

The flow control applied between the core source and the core destination may include a flow control algorithm whereby the rate of transmission of the non-real time traffic on the path is regulated by providing feedback information to the core source concerning congestion at a contention point on the path.

The flow control applied between the core source and the core destination may include a flow control algorithm whereby the rate of transmission of the non-real time traffic on the path is regulated by providing an explicit rate of transmission to the core source.

The non-real time Virtual Path Connection may operate according to an Available Bit Rate (ABR) service category.

At least one of the connections aggregated onto the path may be provisioned with a guaranteed bandwidth and the guaranteed transmission bandwidth of the path may be obtained by summing the guaranteed transmission bandwidths for the connections aggregated onto the path.

The guaranteed transmission bandwidth for the connections may be a guaranteed minimum transmission bandwidth and the guaranteed transmission bandwidth for the path may be a guaranteed minimum transmission bandwidth.

The transmission bandwidth in the network core may be allocated between real time traffic and non-real time traffic and a share of the transmission bandwidth in addition to the guaranteed minimum transmission bandwidth for the path may be made available to the path if the transmission bandwidth allocated to the real time traffic is unused.

A share of the transmission bandwidth in addition to the guaranteed minimum transmission bandwidth for one of the plurality of connections may be made available the connection if the transmission bandwidth allocated to another of the connections is unused.

The core source to core destination flow control applied between the core source and the core destination may be provided by a plurality of ABR flow control segments between the core source and the core destination.

The core source may further include a set of queues each corresponding to one of the classes of transmission service that are associated with the plurality of connections. The non-real time traffic received over the connections may be queued in the queue associated with the class of transmission service associated with each connection before aggregating the non-real time traffic onto the path.

The core source may further include a queue for each of the connections and the non-real time traffic received over the connections may be queued in the queue associated with the connection before aggregating the non-real time traffic onto the path.

Traffic management may be applied to the non-real time traffic at the core source.

The traffic management may include scheduling of the connections onto the path.

In a second aspect, a network entity for use in a connection oriented communications network is provided. The communications network includes a network core wherein traffic entering the network core is aggregated from connections onto paths within the network core. Traffic exiting the network core is segregated from the paths onto connections outside the network core. The traffic includes real time traffic and non-real time traffic. The real time traffic and the non-real time traffic are aggregated onto respective real time paths and non-real time paths. Each of the non-real time paths has a class of transmission service. Each of the connections carrying non-real time traffic has a class of transmission service such that at least

two of the connections aggregated onto a non-real time path do not respectively have a same class of transmission service. Each of the non-real time paths is provisioned with a guaranteed transmission bandwidth. The real time traffic on each real time path is transmitted from a corresponding core source to a corresponding core destination according to a first class of transmission service and the non-real time traffic on each non-real time path is transmitted from a corresponding core source to a corresponding core destination according to a second class of transmission service. Flow control is applied between the core source and the core destination corresponding to each non-real time path to thereby regulate the rate of transmission of the non-real time traffic along the non-real time path. The network entity includes a first queue for storing real time traffic received at the network entity over at least one of the real time paths and a second queue for storing non-real time traffic received at the network entity over at least one of the non-real time paths. The network entity also includes a scheduling mechanism for servicing the first and second queues to thereby respectively generate non-real time traffic and real time traffic in an outgoing direction and a flow control mechanism for regulating the rate of transmission of the non-real time traffic received at the network entity along each of the non-real time paths.

In a third aspect, a connection oriented communications network is provided. The communications network includes a network core, traffic entering the network core is aggregated from connections onto paths within the network core and traffic exiting the network core is segregated from the paths onto connections outside the network core. The traffic includes real time traffic and non-real time traffic. The non-real time traffic which enters the network core and is aggregated onto a path is received from connections that each have a class of transmission

service such that at least two connections have classes of transmission service different from each other. The real time traffic and the non-real time traffic are each aggregated onto respective real time paths and non-real time paths. Each of the non-real time paths have one of the classes of transmission service and is provisioned with a guaranteed transmission bandwidth. The real time traffic on each real time path is transmitted from a corresponding core source to a corresponding core destination according to a first class of path transmission service and the non-real time traffic on each non-real time path is transmitted from a corresponding core source to a corresponding core destination according to a second class of path transmission service. Flow control is applied between the core source and the core destination corresponding to each non-real time path to thereby regulate the rate of transmission of the non-real time traffic along each non-real time path.

Please replace the paragraph beginning on page 19, line 10 with the following paragraph:

A simplified network entity such as the network entity or element 220 of Figure 5 may be used in a network core in which the methods of this invention are implemented. The network entity may be a switch, router or other network device wherein a contention point for network traffic may occur. For example the network element could be used in an ABR VPC core network in which all per-VC traffic management is performed at edge nodes, such as the network core 2 of Figure 1 or the VPC network core 106 of Figure 2. Because VCC arbitration is performed at the edge in these networks, the core network entity 220 only needs to support two service categories, for instance a first service category for VPCs carrying real time traffic and a second service category for VPCs carrying non-real time traffic. Real time VPCs 222A and non-real time VPCs 224A are received at one or more input ports 223 of the network entity 220. Real

time VPCs 222B and non-real time VPCs 224B are egressed at one or more output ports 225 of the network entity 220. In the example according to Figure 5, the input ports 223 and output ports 225 are provided by way of a bidirectional link 227X. Other bidirectional links 227Y, 227Z comprising corresponding input and output ports like those of the bidirectional link 227X may be provided for the network entity 220.

Please replace the paragraph beginning on page 21, line 18 with the following paragraph:

Quality of Service for incoming traffic received at the input ports 223 over the non-real time VPCs 224A is ensured by a flow control mechanism 232 which may calculate the explicit rate information for the ABR flow control. The bit rates for each of the incoming non-real time VPCs 224A are controlled according to the congestion state of the network entity 220 and the congestion state of other network elements in the ABR control loop associated with the VPC. For instance, the flow control mechanism 232 may receive available bandwidth information from the queue scheduler 230 as at 231 and may receive queue status information from ABR queue 228 as at 233 in order to assess the congestion state of the network element 220. The queue status information may include queue depth or queue growth rate or both, to name some examples. By controlling the bit rates in the individual non-real time VPCs 224A, the network entity 220 ensures that incoming traffic is not arriving at a rate which overwhelms the servicing capacity of the network entity 220. The feedback mechanism 232 also ensures that the amount of traffic aggregated on the non-real time VPCs 224A does not exceed the bandwidth available to the non-real time VPCs 224A. In addition, the feedback mechanism 232 may cause additional available bandwidth to be apportioned to the non-real time VPCs 224A if the bandwidth required by the real time VPCs 222A is reduced. Bandwidth allocation among the non-real time VPCs